

★ ★ BENCHMARKS ★ ★

VOLUME 1 NUMBER 1

JANUARY 1980

TABLE OF CONTENTS

1.	IS THERE ANY TRUTH TO THE "NEW COMPUTER" RUMOR?	1
2.	SO YOU WANT TO COMPUTE	2
3.	SERVICES AVAILABLE TO USERS OF THE NTSU COMPUTING FACILITIES	2
4.	CHARGE RATES	3
5.	HARDWARE - WHAT AND WHERE.	3
6.	SOFTWARE - WHAT WE HAVE AND WHAT WE SUPPORT.	4
7.	JOB CLASS SELECTION.	5
8.	A GLIMPSE AT THE PAST.	6
9.	USAGE STATISTICS	7
10.	ATTENTION SPSS USERS	7

IS THERE ANY TRUTH TO THE "NEW COMPUTER" RUMOR?

One of the most frequently heard questions around the Computing Center these days has been "Are we getting a new system?", or its variation "When are we getting a new system?" Happily, in the BENCHMARKS premier issue, Richard Harris, Director of Computer Systems, is able to supply us with an answer:

Two down and one to go!

Our computer justification, requisition, and request for quote (RFQ) documents have cleared the Systems Division and Governor's Office and are now being processed by the State Purchasing Commission. Bid opening is scheduled for February 11, 1980.

Installation could occur as early as this Spring Break and as late as August, 1980. We will likely install prior to the First Summer term.

The computer and disk subsystem configured will have 3.5 times the overall performance and storage capacity of our current IBM 360 Model 50. Scientific calculation performance is expected to improve by a factor of 5.

This represents the first part of a planned expansion and modernization of computing resources at NTSU, primarily as the result of the findings and recommendations of the NTSU Computer Task Force.

There are five IBM-compatible computer models in our price and performance range:

1. CDC OMEGA III
2. IBM 4341
3. Magnuson M80/43
4. National Advanced Systems AS 3-5
5. National Advanced Systems AS 7031

If CDC or Magnuson is low bidder, an OMEGA II or M80/4 will be installed initially, and upgraded in August, 1980.

All models have balancing advantages and disadvantages that will allow a straight forward low dollar bid evaluation. All except IBM have promised a 30 day delivery schedule.

This system will only partially meet short term requirements and is expected to reach capacity within twelve to twenty-four months. However, it is a very practical first step to meeting long term needs within current departmental operating funds limitations.

Additional space and funding commitments are still urgently needed.

SO YOU WANT TO COMPUTE...

The first step in becoming a computer user at NTSU is to "get a number." Access to the IBM 360 computer and/or related services provided by the Computing Center staff is gained by attaining authorization from the budget authority of the account to which charges are to be made (i.e., department head.) This may be accomplished in several ways, all of which require completion of the NTSU Computing Center Project Number Request Form obtained from the Computing Center. One may (a) go directly to a department head, (b) go through another faculty member, who goes to a department head, or (c) enroll in a class that requires utilization of the IBM 360 (equivalent to b.) Once account authorization is attained, the prospective user will be assigned a PROJECT NUMBER by the Computing Center. It is, of course, the responsibility of the user to protect his/her project number from "pirates" who may conspire to steal computer time. Failure to do so could result in the suspension of the user's account authorization.

In order to obtain a User ID and Password for the Hewlett-Packard (HP) Timeshare System, the NTSU Timesharing Service ID Request Form, available at the Computing Center, must be completed for the issuance of ID codes and passwords. Faculty member approval of the request form is required. As with the IBM project number, the user himself/herself is responsible for the security of his/her ID code and password.

SERVICES AVAILABLE TO USERS OF THE NTSU COMPUTING FACILITIES

The Computing Center provides a number of services to the Academic Community of NTSU. To obtain information about any of the services listed below, call 788-2324 or come by the Information Sciences Building (ISB) Room 119.

Information and Project Numbers can be obtained from Sandy Franklin in the Computing Center Reception Area, ISB 119.

Test Scoring and Analysis is also available from Sandy Franklin.

Newsletter Questions/Contributions/etc. should be directed to Claudia Putnam.

Statistical Programming is handled by Claudia Putnam and George Morrow for faculty members and graduate students. Statistical packages supported are SPSS and the NTSU Statistical Program Library.

Research Programming is provided by George Morrow and David Eaton for graduate students and faculty members.

Non-Research Student Programming Problems are handled by the student consultants, Abdi and Mohammed Salashoor, who can be found in ISB 134A near dispatch and the user keypunch area. Student consulting, provided by the College of Business, is available at the BA Computing Access Facility.

JCL and Debugging Problems should be directed to David Eaton or Douglas Lillard.

Pre-Research Counseling, Including Survey Instrument Design is provided by Claudia Putnam and George Morrow.

Keypunch Requests and Questions Regarding Layout of Keypunch Sheets should be directed to Betty Grise, ISB 227.

Disk and Tape Storage Requests and/or Problems should be directed to Douglas Lillard.

Academic Timesharing (HP2000) Information and/or Problems are handled by David Eaton. This includes terminal problems.

Administrative Applications are handled by Coy Hoggard.

IBM 360/50 Hardware Problems are handled by Douglas Lillard.

Job Dispatch and Retrieval is handled by the I/O Coordinators in Dispatch.

CHARGE RATES

The following is a list of various charges that may affect the NTSU Computing Center user. These include, but are not limited to:

Computer Printer Charges	\$.0004/line	Keypunch Charges	\$6.50/hour
Computer CPU Cycle Time	.03/second	Unit Record Charges	5.00/hour
Computer Processor Time	80.00/hour	1230 Test Scoring Forms	.05/sheet
Computer Disk/Tape I/O	.0009/EXCP	1230 Card Punching	.05/card
Computer Job Charges	.65/job	029 Card Interpreting	.005/card
Research Programmer Time	18.00/hour	Tape Rental	.50/month/reel

For information concerning charges for additional computing services, contact Sandy Franklin.

If a user encounters a valid hardware, system software, or operator error, he or she is entitled to credit for the computer charges. Should this happen, the user should bring all inputs and outputs to the Assistant Director, Academic Computing (Douglas Lillard), so that the cause of the error can be established and credit given, if due. Verbal notification of a problem without supporting documentation will not be considered adequate proof of a problem and no remittance will occur.

HARDWARE - WHAT AND WHERE

The primary computing system at NTSU consists of an IBM 360/50 mainframe with an OS-MVT/HASP operating system. This system is used for batch processing by both academic and administrative users and also supports an administrative online data inquiry and update system (CICS). Academic timesharing services are supported by the Hewlett Packard 2000 Timeshared Basic (HP) system.

Primary locations of computer hardware are the Computing Center (CCTR) located in the north wing, first floor, Information Sciences Building, and the BA Computing Access Facility, located in the north wing, first floor, Business Administration Building. The computer room, student/faculty programming and keypunch area, dispatch desk, which are all in the Computing Center, are open twenty-four hours a day from 7:30 a.m. Monday through midnight Saturday, and from noon to midnight on Sunday, when school is in session. The BA Computing Access Facility is open from 7:30 a.m. to midnight Monday through Saturday, and noon to midnight on Sunday, when school is in session.

Following is a list of hardware and their locations.

<u>IBM 360 MODEL 50 COMPUTER SYSTEM</u>		<u>LOCATION</u>
IBM 2050	CPU with one megabyte of memory, 512K IBM and 512K Fabritek	CCTR
MDS M2900	Dual Density Disks - 16 Drives (933.6 megabytes)	CCTR
STC 3470	Tape Drive: 9 track - 1600 BPI, 320KB	CCTR
STC 3430	Tape Drive: 9 track - 1600 BPI, 120KB	CCTR
STC 3430	Tape Drive: 9 track - 800/1600 BPI, 120KB	CCTR
IBM 1403-N1	Line Printer, 1100 lines/minute	CCTR
IBM 1416-1	Two interchangeable print trains, PN and ALA	CCTR
IBM 2540-1	Card reader/punch, 1000 cpm/300 cpm	CCTR
IBM 1052-7	Console Printer	CCTR
IBM 3277-2	Sixteen CRT Display Stations (local)	2 each CCTR
Compatible		2 each Hospital
		12 each Admin. Bldg.
Documation 6501-IV	Card Reader, 1000 cpm	CCTR
Memorex 1270	Terminal Control Unit (32 lines)	CCTR
Paradyne Data Set SRM-192	Communication equipment, 9600 baud	CCTR
Unitech UT-2	Processor	BA 152
Documation M400L	Card Reader 600 cpm	BA 152
Unitech 6444	two data printers 600 lpm	BA 152
Unitech KB-1	CRT Console, 1920 characters	BA 152

LOCATION

HEWLETT PACKARD 2000 MODEL 40, TIMESHARING COMPUTER SYSTEM

HP 2108A	M/20 System Processor (64K)		CCTR
HP 2112A	M/20 Communication Processor (64K)		CCTR
DEC LA36	Console Terminal (30 cps)		CCTR
HP 7905A	Disk Storage Units (29.5 Million Bytes)		CCTR
HP 12972A	Tape Drive (1600 BPI, 72KB)		CCTR
HP 2748B	Paper Tape Reader (8 level 500 cps)		CCTR
HP 12920B	Asynchronous Multiplexers (32 RS-232 terminal interface ports)		CCTR
General Tel. T113	BDS Data Station (12 dial-up Phone Lines, 110-300 Baud)		CCTR
Timesharing Terminals	at the following locations:	5 each CRT 5 each DEC LA36	BA 153
		1 each CRT	ISB 135
		2 each CRT 4 each DEC LA36	ISB 224
	(Available by appointment)	9 each CRT 1 each DEC LA36	MUSIC
		1 each DEC LA36	WH 173 (8 am-5 pm)
		1 each CRT 2 each DEC LA36	WH 131 (8 am-5 pm)
		1 each Diablo D1620 Quality Hardcopy	ISB 229

UNIT RECORD EQUIPMENT

IBM 1230	Optical Mark Scoring Reader with 534 Card Punch		CCTR
IBM 029	Card Punches	10 each	BA 151
		12 each	CCTR
IBM 059	Card Verifier		CCTR
IBM 083	Card Sorter		CCTR
IBM 085	Collator		CCTR
IBM 514	Reproducer		CCTR
IBM 029	Interpreting Card Punch		CCTR

SOFTWARE - WHAT WE HAVE AND WHAT WE SUPPORT

The following table is a "Software Support Key" designed to inform users of the level of support the Computing Center offers for (A) Maintenance, (B) Documentation, and (C) Consultation with regard to the software available on the IBM 360/50 and the HP2000/40. As stated, letters in parentheses denote abbreviations for each category.

Software Support Key**

	FULL (F)	PARTIAL (P)	MINIMAL (M)	NONE (N)
Maintenance (MT)	a. New versions with major improvements installed as soon as possible. b. Bugs fixed by CCTR Staff or reported to vendor as soon as possible. c. Vendor committed to fixing bugs.	a. New versions with major improvements installed as staff is available. b. Known errors may exist. c. Vendor may not be committed to fixing bugs.	a. New versions if available installed if no major mods required. b. Known errors may remain. c. No guarantee of support from vendor.	No Maintenance
Documentation (D)	Full documentation from vendor or local source.	Documentation from vendor or local source may be inaccurate or incomplete.	Local documentation only on access. Other documentation may be available.	No new documentation.
Consultation (C)	Consultants familiar with use and problems of processor.	Consultants have information on access, but more than that depends upon available staff.	Consultants have information on access only.	Consulting help may not be available.

**Letters in parenthesis denote abbreviations for each category.

IBM 360 MODEL 50 SOFTWARE

PROCESSOR/LIBRARY	SUPPORT			SOURCE	COMMENT
	MT	D	C		
*FORTRAN IV	P	F	F	IBM Corporation	Version G
*FORTRAN IV	P	F	F	IBM Corporation	Version H
WATFIV	P	P	F	University of Waterloo	In-core FORTRAN Lang. Trans.
*COBOL	P	F	F	IBM Corporation	ANS Version 2
WATBOL	F	F	F	University of Waterloo	In-core ANS COBOL Lang. Trans.
*PL/1	P	F	F	IBM Corporation	Version F
PL/C	P	F	F	Cornell University	In-core PL/1 Lang. Trans.
FORMAC	P	F	M	IBM Employee Contributed	PL/1 F SUPERSET
*Assembler	P	F	F	IBM Corporation	Version F
*ALGOL	P	F	P	IBM Corporation	Version F
*RPG	P	F	P	IBM Corporation	
GPSS/360	P	F	M	IBM Corporation	
SIMSCRIPT	F	F	M	Consolidated Analysis	Version II.5
SNOBOL4	P	F	P	Bell Telephone	
SPIBOL	P	F	P	Illinois Insti. Technology	In-core SNOBOL4 Lang. Trans.
NTSU STATPAK	F	F	F	NTSU	
SPSS	F	F	F	University of Chicago	Release 8
OSIRIS	P	F	M	University of Michigan	Version III
BMD	N	P	P	UCLA	
Misc. Prog. Library	F	F	F	NTSU	
Misc. Subroutines	F	F	F	NTSU	
*OS Utilities	P	F	F	IBM Corporation	
CASORT	F	F	F	Computer Associates	Sort Utility
User Library	N	N	N	NTSU Users	Individual user programs which could benefit others.
Scientific Library	N	F	P	IBM Corporation	
FORMAT	P	F	M	IBM/Stanford	Release 5

HEWLETT PACKARD 2000 MODEL 40 SOFTWARE

PROCESSOR/LIBRARY	SUPPORT			SOURCE	COMMENT
	MT	D	C		
SPSSHPP	P	F	P	DePaul University	
BASIC	M	F	F	Hewlett Packard	
EDITOR	M	F	P	Hewlett Packard	
FCOPY	M	F	P	Hewlett Packard	
CAI	M	F	M	Hewlett Packard	Instructional Dialogue Facility
FINDIT	P	F	P	Hewlett Packard	
SYSPDS	P	F	P	NTSU	
HP Contributed Lib.	M	F	N	HP Users	
A900-Pseudo Lib.	N	F	N	NTSU Users	

*Available in R21.8F of OS (The last version of OS/360 that IBM will distribute.)

JOB CLASS SELECTION

The operating system (OS-MVT) used at NTSU on the IBM 360/50 allows concurrent use of the computer by multiple users. User jobs must be scheduled for execution so that the total resource allocation of the job mix at any time does not exceed the available resources. The NTSU job class structure is designed to prevent allocation conflicts by allowing the operator to schedule which job classes will run concurrently.

Factors which affect the job class are the number of tape drives required, the number of offline disks required, and the amount of memory storage required. In addition, an upper limit on CPU time and lines printed is imposed on certain job classes to prevent long-running jobs from disrupting turnaround time.

JOB CLASS TABLE

TAPE CORE DISK SIZE	TIME(T) and LINES(L) LIMITED TO $3 \cdot T + L / 1000 \leq 45$			NO LIMIT ON TIME AND LINES	
	NO DEVICES OR 1 TAPE	ANY OR ALL OF 2 TAPES OR 1 DISK	ANY OR ALL OF 3 TAPES OR 1 DISK	NONE OR ANY/ALL OF 2 TAPES OR 1 DISK	ANY OR ALL OF 3 TAPES OR 1 DISK
90K	A (NO DEVICE)	I	C	J	M
144K	B	G	C	K	M
234K	D	D	C	N	M
ONLINE BATCHING CLASSES	PL/C uses Class = 1 WATFIV uses Class = 2	SPITBOL uses Class = 3 WATBOL uses Class = 4	(T + L/1000 ≤ 4)		

K = 1024, therefore 90K = 92,160 bytes.

In choosing the correct job class from the job class table, you must first determine if your time and lines estimates are within the imposed limit. To do this, you multiply your time estimate (in minutes) by 3 and add your lines estimate (in thousands.) If the result is less than or equal to 45, choose a class from the limited section; otherwise, pick a class from the no limit section of the table. Class J, K, M, N jobs are normally run overnight. Most jobs will run in one minute and print less than 2000 lines. Jobs which are expected to run in excess of one hour must be scheduled through the Operations Manager.

After determining the potential job classes based on time and lines estimates, the job class which allows the required number of tapes, disk, and memory can be selected from the job class table. Since there is only one dual density tape drive, a job requiring an 800 BPI tape should select class C or M.

Jobs which use the internal batching facility, PL/C, WATFIV, SPITBOL, or WATBOL require a job class of 1, 2, 3, or 4 respectively. If a job uses any of these online batching compilers, but has a time plus lines estimate greater than four (4) or requires additional I/O or memory, it must not use the online batching procedure and therefore requires a class that reflects the required resource allocation.

The amount of memory storage required for a given job can be difficult to determine. The linkage editor or loader map "total length" plus 2 * buffer size for each DD statement specified plus 3K to 10K (language dependent) will normally give the upper bound of memory required for a given program. FORTRAN H compiles may require 144K, but will normally require more memory. SNOBOL4 and SIMSCRIPT require more than 144K. When executing PL/C, WATFIV, SPITBOL, or WATBOL without online batching, you should use a class indicating 144K or more. The PL/I compiler and the CASORT SORT/MERGE program are dynamic in that they will utilize whatever memory is available, with considerable time savings possible where memory allocation is significantly increased. All other language translators and utilities will normally run in 90K.

The NTSU Statistical Programs will generally require class A or B. The BMD Statistical Programs will most often use class B with some procedures requiring a class of D. Osiris III jobs usually require a class of B or G. SPSS, MODEL 204, SYMAP, CINDYMJD, LAOCOON, and F24ASM programs require more than 144K of memory.

On occasion it may be necessary to experiment with a job to determine the time and lines estimate as well as the memory requirements. It is extremely important that the job class chosen corresponds to the time/lines estimates in the JOB card and the tape/disk/memory allocations of the job.

A GLIMPSE AT THE PAST

Computing at NTSU got its start in 1962 with the purchase of an IBM 1620 to support academic users. An IBM 1440 was acquired in 1964 to perform administrative data processing. In 1966 the 1440 was replaced with an IBM 1401. The Computing Center as it is known today was formed in 1970 with the acquisition of a leased IBM 360/50.

The original configuration of the 360/50 CPU included one multiplexor channel, one selector channel, 256K core memory, a 1403 line printer, a 2540 card reader/punch, three 30KB tape drives, and five 2314 single density disk drives. The original operating system was OS/MFT/HASP supporting a maximum of three user partitions.

The capacity of the IBM 360 was doubled in 1973 and several administrative inquiry/update terminals were installed in 1974.

In 1976, the HP2000 access computer was purchased to provide low cost, BASIC language only, timesharing terminal support. More than fifty terminals currently access the HP timesharing services.

The IBM 360 capacity was again doubled in 1978 when the leased CPU was replaced with a purchased unit with a full megabyte of core memory. 1978 also saw the installation of sixteen Apple microprocessors in the Computer Science Department.

The final IBM 360 upgrade occurred in 1979 when an additional bank of disk drives were added, the OS/MVT operating system was implemented, and a remote job entry station was installed in the College of Business.

It should be noted the computer upgrades since 1976 have fallen far short of the demands of rapidly increasing enrollments in computer related degree programs. If the University is to learn from the past, current and future commitments to computing related degree programs must be accompanied by corresponding commitments to computing support.

USAGE STATISTICS

The Computing Center has seen a dramatic increase in the number and complexity of jobs processed in the past years. Below is a comparison of usage for the Fall 1978 and Fall 1979 semesters.

	<u>FALL 78</u>	<u>FALL 79</u>	<u>INCREASE</u>
Number of 360 Jobs Run	66,367	100,851	52%
Average Execution Time per Job (Min.)	2.44	3.30	35%
Average Print Time per Job (Min.)	1.77	1.56	-12%
360 Average Turnaround (Min.)	48.02	64.98	35%
HP Users	1,936	2,201	14%
HP Connect Hours	15,734	17,550	12%
HP Disk Blocks Used	45,341	52,862	17%

*** ATTENTION SPSS USERS ***

Version 8 of SPSS has been installed and is being checked for bugs (Version 7 is still on the system and is the one you get when you execute the SPSS procedure.) You can help by running your programs using Release 8 instead of 7 and reporting any problems to George Morrow or Claudia Putnam.

Release 8 is accessed by inserting:
 //STEPLIB DD UNIT=2314,VOL=SER=USRVOL,DISP=SHR,
 // DSN=RSRCH.D0683.P8606.SPSS
 //FTL0F001 DD DSN=RSRCH.D0683.P8606.SPSS.UDC,DISP=SHR
 directly after your // EXEC SPSS control card.

As soon as Version 8 is deemed acceptable, it will replace Version 7, which will be removed from the system. In anticipation of this, the University Store has some SPSS Update manuals on order, which should arrive in several weeks.

Release 8 has a number of new facilities and major revisions. Among the new facilities are REPORT and SURVIVAL. REPORT produces case listing and aggregated summary statistics in a format controlled by the user. SURVIVAL produces life tables, graphs of survival functions, and comparisons of survival functions between groups.

Let us hear from you if you have problems with this new release!

 * Reader/user feedback is encouraged,
 * BENCHMARKS is a quarterly publication of the NTSU Computing Center.
 * so send all letters, suggestions, etc., to:
 * NTSU Computing Center
 * Box 13495 NT Station
 * Denton, TX 76203
 * BENCHMARKS Editor
 * Claudia Putnam Director of Computer Systems
 * Richard Harris Assistant Director,
 * Douglas Lillard Academic Computing
 * *****

This is the first issue of BENCHMARKS, the Computing Center newsletter aimed at the NTSU academic community. A benchmark is a point of reference from which measurements of any sort are made, and that name was chosen to symbolize the intent of this publication - to provide a point of reference for the users of the North Texas State University computing facilities. BENCHMARKS was created to provide a channel of communications between the NTSU Computing Center and its users - a channel, hopefully, that will flow both ways, enabling both the users and the Computing Center staff to gain new insights into the ever changing world of academic computing.

